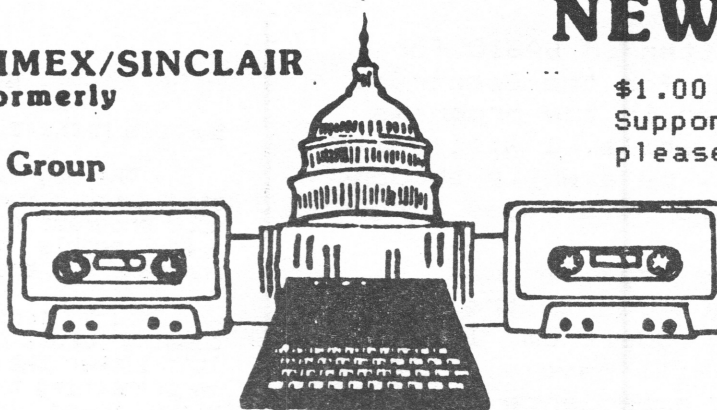# CATS

CAPITOL AREA TIMEX/SINCLAIR USERS GROUP :Formerly
Prince George's
Timex/Sinclair User's Group

NEWSLETTER

* * * CONTENTS * * *

October Meeting

At 11:00, Tom Bent's hardware workshop. Got loading problems? At 2:00, Bill Russel will be coming down (85% chance) and demonstrating his color from a B/W TV program.

PRESIDENT'S MESSAGE

No pep talk this month! NO NEED TO
Our efforts to stimulate more
active participation in club
programs was handsomely met by Vic
President TOM BENT's initiative to
organize and lead a Hardware
Workshop. Last Saturday morning
before the General Membership
Meeting, from 11 am to 2 pm, some
22 members who had signed up, $21
checks in hand, appeared at the
library, smoking solder irons
waving, burning rosin wafting, prom
burner working — as Oliger
cartridge Boards were being
prepared to receive Sinclair
Spectrum emulator chips.

The session can only be called an
unqualified sucess as all boards
checked out OK, even though some of
us needed much help to clean up
rather messy soldering jobs. In
this, Tom had help from good
natured folks like Stan Guttenberg,
Tony Brooks and others.

Being a spreadsheet junky, I
borrowed Tom's "Omnicalc 2" program
so I could put my new emulator to
work immediately. It loaded nicely,

once I found out from a phone call
to Tom, that I first had to type in
the command "OUT 244,3" to get the
new board working. The screen
format looked very familiar indeed
and when I opened the Documentation
to see the commands, it was
immediately clear that Omnicalc-2
was good old Memocalc with some
enhancements. But WHAT
enhancements! Not all, but most, of
my wishlist for an upgraded
Memocalc have been provided in
Omnicalc-2, I think.

Let me make one thing perfectly
clear — Omnicalc is not just LIKE
Memocalc. It IS Memocalc, with
eleven enhancements. When I have
more time to work with the program,
I will write a review of it for the
next issue of the Newsletter.

While shopping at Montgomery Mall
after the General Meeting, I found
a book in Walden Bookshop called
"Build your own Expert System" by
Chris Naylor. Since one of my
interests is Artificial
Intelligence, and Expert Systems
are one type of program that comes
within that rubric, I bought it. I
found that it includes three
programs demonstrating Expert

Systems and written in BASIC for the Apple II AND for the Spectrum. Once I have keyed in the programs and used them a while. I will write a review. It may be a while though, as one program is five pages long.

This then is the saga of one member's introduction to the English Sinclair Spectrum. I suspect others will have similar upbeat kinds of experience - upbeat because in effect we now have new machines: the Spectrum. which is very much alive and for which there are hundreds of programs and new ones being created in England all the time.

Next month the Hardware Workshop will have sessions building expansion boards and the RS232 serial port. with which we can then use the inexpensive Modems now available. These will open new vistas again for the 2068 in an affordable manner. A number have signed up already, so it looks like a future network is in the making. With a telephone conference call, maybe we can eventually hold General meetings in our own homes. using the computer network. And Jim Mackenzie can download his CATS library of programs by phone (or is it upload?).

In any event, it is clear that much new use and fun is available to the 2068 owners. And with Tom Woods new Newsletter dedicated to the Memotext and Memocalc programs for the T/S 1000, upgrades of those programs will give that machine new usefulness and a longer life. No wonder that our membership is at a new high and growing every month. And just to think that some among us thought our group would have died on the vine months ago! Happy computing! John Conger

EDITOR'S COLUMN

Not long this time - no room! Coming next month (perhaps): Reviews/ information on OMNI-CALC, DEVPAC, the Larken disc I/F, speech synthesis software, and more. WRITE!

TAPE DUBBING

By Jim MacKenzie

The dog days seem to have diminished attendance. However I received several good programs for the TS 2068 library, and a few people promised to bring more programs for the TS 1000 library.

I'm sorry about some tapes not comming across on the dubbing. I think it's either the splitter box, or a mistake in connecting the wires. We're using a winky board in conjuction with the splitter, so I'll check the splitter and double check the connections next time.

Finally, my work is seasonal, and the colder it gets, the longer I have to work. So I'll soon have to pass the torch to a new librarian. I've enjoyed the job immensely, it's easy, and very interesting. It wasn't until I saw George White's wonderful MC programs, that I found the nerve to try MC programming. So anyone wishing to volunteer call Mark (301-589-7407) or myself Jim (301-495-9139), or speak with us at the next meeting. Don't be shy, it's a fun job.

Contributors

John Bloxham	Jim Mackenzie
Tony Brooks	Roald Schrack
John Conger	Johnathan Vanderwall
Ken Corwin	John Walker
A. K. Dewdney	H. E. Weppler
Mark Fisher	George White
Brian Little	

Officialdom

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N/L Paste-Up	Sarah Fisher
N/L Mailing	Jules Gesang

2710 Macomb St., N.W.
Washington, D.C. 20008

The Editor
CATS Newsletter

Dear sir,

I am sorry to write that the TV-to-monitor conversion by John Monkus, reprinted in the September issue of CATS newsletter, is very dangerous and should not be attempted. Unfortunately, the conversion will actually work and yet be capable of delivering a lethal shock to the operator, never mind what can happen to the computer.

For the technically interested, I proffer a brief explanation. Capacitive isolation works and is safe so long as the capacitors are so small as not to be able to deliver a lethal shock, and so long as they have an adequate voltage rating. A rating of 400 volts would be safe, at least for the capacitor. The large capacitors used in the article would of course be polarized, which is not safe either. Reverse-poling such a capacitor causes it to fail to a short circuit.

The reason that the conversion will work is that the TS-2068 is isolated from the line by its own transformer, and can be floated at any potential up to the limits imposed by insulation breakdown in the 2068 power transformer. The danger occurs when the TV chassis is "hot", i.e. connected to the ungrounded side of the ac line. The reactance of the capacitor is such that the 2068 now is also live. If now someone touches any ground connection to the 2068 and a true ground, current will flow through the capacitor and the operator, reverse current (or overvoltage) will instantly short the capacitor and do the operator no good at all.

Sincerely,

Jonathan Vanderwall

Jonathan Vanderwall

On Saturday morning, August 10, the Library sponsored a hands-on computer awareness workshop for local children, aged 10 to 13. Eight members of the Capital Area Timex Sinclair computer group (CATS) set up eleven terminals in the second floor meeting room of the Municipal Building. Charles Dickson, a systems analyst at the U.S. Department of Agriculture, led

Kids & Computers A Fun Combination!

the two and a half hour session by first introducing group members to the seventeen children present, then introducing the computers and their capabilities to the participants. Takoma Park resident, Mark Fisher, a CATS member, explained the parts of a computer, how its memory works, and how to draw pictures. After a "lemonade break," Mr. Dickson taught the group how to write a program for "making a peanut butter and jelly sandwich." Pretending to be a computer,

Mr. Dickson followed the step-by-step instructions that the children dictated to him. A graphic lesson in the problems of giving imprecise instructions to a computer was learned by all when the sandwich produced had peanut butter spread on all sides of the bread, and the jelly side of the sandwich placed face down on the table. Amid much laughter, the lesson learned was that computers are not very smart, and will do exactly what you tell them to, regardless of the outcome. As the workshop concluded, parents arrived to find CATS members and children eagerly playing computer games and displaying their computer skills to each other. All of us involved in Saturday's workshop truly appreciated the time, terminals, and relaxed expertise freely given by the CATS group to the children of the Takoma Park area.

—Andrea Cincotta,
Assistant Library Director

Takoma Park Newsletter, 8/85

C.A.T.S. 3 October

THE COMPUTER MARKET IN ENGLAND

This summer I spent three weeks in Europe, two of them in England. While in England I took the opportunity to purchase some Spectrum software and hardware and look at the home computer market in Britain. I do not intend to delve in detail into the many problems of the Sinclair empire. Many of you will have read of the intended takeover of Sinclair Research by newspaper owner Robert Maxwell. A takeover that fell through when Mr Maxwell found out how big the problems were in Sinclair Research and in his own newspaper empire. Now it seems that Sir Clive has been bailed out by 'Dixons' a big U.K. chain of photo/electronic stores who have bought up all of Sinclair's unsold stock.

Most home computers in Britain are sold through a few large chain stores, notably Boots, W.H.Smiths, Greens, and Dixons. There are also some specialist computers shops but I did not see many outside London. Most of my shopping was done in medium to large provincial towns so it should be fairly typical of that found by the average British shopper.

On the basis of what I saw Sinclair computers are by far the most popular. All stores boasting any sort of computer department carry Spectrums and usually QL's. In fact QL's were easy to obtain for as little as £299 (but don't rush to buy one yet, there will be a BIG price reduction soon.) However the large number of QL's seems to indicate substantial unsold stocks of QL's rather than any popularity of the QL.

Based on what I saw the Amstrad CPC464 and 664 are second to the Spectrum. The Amstrad 8-bit 64K machines were launched last Christmas in Britain and have proved very popular. All the remaining home computers offered in Britain seemed to be way behind these two. I was in Britain for a few days last December and I noticed that since then computers made by Atari, Commodore and the Japanese MSX machines are much

less in evidence. Software for the Commodore C64 is supposed to be second only to the Spectrum in sales but this must be based on past C64 sales. It is not easy to find a C64 in many areas because some stores are refusing to stock the C64. This is apparently because of an erratic pricing policy by Commodore who have been dumping some machines in Britain at low prices. The only other computer in evidence was the BBC model B which is catering for the top end of the British home computer market.

It is now possible to find defunct machines like the ORIC and DRAGON gathering dust in some shops and being sold at big discounts. Typical prices for such obsolete machines are £50 or less. Now that the Spectrum+ has replaced the 16K and 48K Spectrums these latter machines can also be bought at low prices. I saw a 16K Spectrum for £39.95 in W.H.Smiths in Waterloo station in London.

If you are looking for Spectrum software in British stores you will probably at first be delighted to see lots of Spectrum software at low prices. Then you may be disappointed when cannot find any item on your list. Basically two kinds of software are usually available, the very latest top ten most popular games and 'old' software from last year or before. By the time we hear about Spectrum software in the U.S.A its out of the top ten but not yet on the discount shelves.

I found the best range of Spectrum software was not in any computer shop but in H.M.V. record stores which can be found all over Britain. Nevertheless I had a good time bying some low price software at £2 or less since there is a large selection of quality items at these prices. There has definitely been a downward trend in the price of new software since last year. There is now very little software introduced at over £10, the days when a game like the Hobbit could be sold for £15 have gone. There is also a trend towards new software at budget

Prices, for example British Telecom has introduced a range of software at £2.50 each.

However some U.S. dealers now seem to be taking advantage of low price Spectrum software. I've recently seen Traxx offerred for $9.95 yet this game can now be obtained in England for less than £1 including tax! Of course if you have to go to England to get the low price then you might consider the U.S. price reasonable.

If you want anything other than a basic computer and some software in Britain you could be in for a long search. The only Spectrum hardware add ons easily available are joysticks and joystick interfaces. Next most common were Microdrive expansion kits. Beyond those items its like searching for hens teeth. The only Spectrum hardware add-ons easily available are joystick interfaces. Next most common were microdrive expansion kits plus an occaisional offering of extra microdrive units. I found (and purchased) a light pen in a computer shop in Chester. In Cambridge I found the only store I saw offering disc drives (The Opus Discovery 1),and they had just one unit in stock. In seems just as easy to order Spectrum hardware by mail direct from England or from a American T/S supplier (providing they do not mark up the price too much) rather than waste too much time searching British stores. It may be that some central London computer shops carry better hardware stocks, however I did not see much evidence of this when I was in London last December.

The home computer market in Britain is almost totally games oriented and most British computer magazines seem aimed at games players under 20. Nevertheless this has lead to a high rate of computer ownership, considerably higher than in the U.S.A. and second only to Japan. There is no doubt that the market is slowing down and gross overstocking of hardware and software has, and is, leading to the downfall of countless software houses,

computer distributors, and to Sir Clives current problems. The future of Sinclair is difficult to predict. The Spectrum can't last forever and its doubtful if even a low price QL will ever be as big a success. Meanwhile Uncle Clives eyes seem, as ever, fixed on far distant horizons.

TONY BROOKS

BOLD PRINT

This program provides a heavier version of each item of the character set. They are stored in RAM at 64512 and may be used as needed with input from tape, memory or keyboard.

The only instructions are in line 9995. After running, the program may be deleted and the bold print will remain in memory while other programs are loaded or cleared. The type for a particular use may be selected manually or, if it is to be switched within a run, the order may be inserted within the program.

The mnemonics for the machine code in lines 9960-9970 are:

```
SOURCE      LD HL,15616
END         LD BC,16383
DEST        LD DE,64512
TRANS       LD A,(HL)
            SRL A
            OR (HL)
            LD (DE),A
            SBC HL,BC
            RET Z
            ADD HL,BC
            INC HL
            INC DE
            JR TRANS
```

```
9900 REM ::::::::::::: BOLD PRINT
9910 CLEAR 64511
9920 LET N=65300
9930 READ MC: IF MC=999 THEN GO
TO 9980
9940 POKE N,MC
9950 LET N=N+1: GO TO 9930
9960 DATA 33,0,61,1,255,63,17,0,
252
9965 DATA 126,203,63,182,18
9970 DATA 237,66,200,9,35,19,24,
243,999
9980 RANDOMIZE USR 65300
9990 POKE 23607,251: LIST 9995
9995 REM ::::::::::::: SELECT TYPE
FOR REGULAR TYPE - POKE 23607,60
FOR BOLD TYPE  -  POKE 23607,251
```

H.E.UEPPLER

## ROTATING THE CHARACTERS

Have you ever wished to print a keyboard character at right-angles or even upside-down? It can be useful when labeling curves or other graphics, but it's tedious to enter User Defined Graphics manually, bit by bit.

The program ROTATE CHARS will rotate a keyboard character or symbol by 90, 180 or 270 degrees and store it in the UDG memory.

The first entry is the amount of rotation. Following that, a series of characters may be rotated and stored in any chosen UDG location. To go to another rotation, reply to the CHAR prompt with XX. To quit, answer the ROTATE prompt with 0.

The selected UDG locations will be listed on the screen and the rotated characters will be displayed, pixel by pixel, as formed. The list may be COPY'd for use as an index. The rotated characters are accessed in the usual way for UDG's.

Once characters are entered, NEW may be entered to dump the program. The characters will remain in UDG memory and the desired program may be loaded or commands entered.
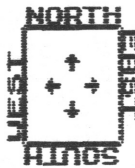
```
    5 REM ‡‡‡‡‡‡‡‡‡‡ ROTATE CHARS
   10 INPUT "ROTATE X DEGREES ? "
;X: LET X=90‡INT ((X+45)/90)
   15 IF X>270 THEN GO TO 10
   20 IF X=0 THEN GO TO 116
   25 INPUT "CHAR ? ";C$
   30 IF C$="XX" THEN GO TO 10
   35 INPUT "LOCATION ? ";L$
   40 PRINT TAB 10;"E";L$;" = ";
   50 FOR N=0 TO 7: POKE USR L$+N
,0: NEXT N
   55 FOR N=0 TO 7
   60 LET D=PEEK (15616+8‡(CODE C
$-32)+N)
   65 FOR J=7 TO 0 STEP -1
   70 IF D=0 THEN GO TO 110
   75 IF D<2↑J THEN GO TO 105
   80 LET D=D-2↑J
   85 LET A=(7-J)‡(X=90)+(7-N)‡(X
=180)+J‡(X=270)
   90 LET B=N‡(X=90)+(7-J)‡(X=180
)+(7-N)‡(X=270)
   95 POKE (USR L$+A),2↑B+PEEK (U
SR L$+A)
  100 PRINT TAB 17;CHR$ 8;CHR$ (C
ODE L$+79);
  105 NEXT J
  110 NEXT N
  115 GO TO 25
```

H.E. WEPPLER

Intermediate machine code classes will be held the THIRD and FOURTH Saturdays, from 2pm to 5pm, Sept, Oct. and Nov.

Place: my house - at 4814 GRANTHAM AVE, Chevy Chase, MD. This is in Somerset Village which is between Wisconsin and River Road just north of Friendship Heights. Best to see a street map of the area or call me: 654-5751.

Introductory classes were held last spring and summer and covered the fundamentals, using as the text Zaks' "Programming the Z80". The Intermediate group will continue study of the Z80 instruction set in more detail, since that is the core of the subject, but will also start study of the ROM and its subroutines using David Woods book: "The Practical Guide to Machine Language Programming on the Timex/Sinclair". This is an interesting and useful book on our machines whether you plan to learn machine code or not. I strongly recommend it as a part of your computer library.

While I am listing computer books, those of you most interested in the 2068 should know about the "Timex Sinclair 2068 Intermediate/Advanced Guide" by Jeff Mazur, published by SAMS, and which is completely written as a machine code handbook for the 2068. I plan to use parts of it in our classes.

Also Joseph Carr, who wrote the "Z80 Users Manual", wrote an adaptation of the Manual for Timex machines, both the 1000 and 2068. Roughly half the book is on interfacing. As such, it should be helpful to the Hardware Workshop group. This book is titled: "T/S Machine Language Programming and Interfacing".

5667 Ravenel Lane
Springfield, VA 22151

September 16, 1985

Mr. Mark Fisher
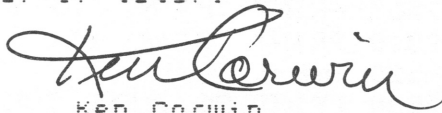700 Erie Avenue
Takoma Park, MD 20912

Dear Mark,

Just a note in response to your request at the meeting on saturday regarding the hardware session that morning.

I found it to be an enjoyable and educational experience.

The only suggestion I have may not be applicable just to the hardware sessions, but also to meetings as well. It was voiced by someone during the meeting. It is this: Use terms such as AROS, EXROM, LROS, etc., as sparingly as possible. Some of us (most of us) have heard these terms but haven't really been able to identify with them clearly. I know for a fact that BINARY is what used to happen to the vacuum tube in a Class A amplifier when it began to draw grid current.

Don't despair. We'll all come around sooner or later.

Ken Corwin
703/321-8439

P.S. Tasword II set for 32 col. width for T/S-2040 printer.

TERRY HARDENBERGH
LT CDR USN (RET)
1480 S MARENGO AVE
PASADENA CA   91106
(818) 799-2933

C.A.T.S.
POB 725
Bladensburg, MD 20710

All my grandchildren have loved this little program. They learn letters, laugh at the little engine chugging away and prod each other when an error erases part of the train.

Terry Hardenbergh

26 August 1985

Mark Fisher has offered to help teach the intermediate group this fall when possible. Thank goodness! I was really getting over my head - almost. Brian Little, an electrical engineer who studied computers at Penn State, has offered to talk to us on computer logic, which is more than just AND, OR and NOT. The subject, while getting more complex is also getting more interesting. I personally am learning a lot about how the machine works and why - which is reason enough to learn machine code.

Anyone who wants to start from scratch can give me a call and I will set up a mutually agreeable time to meet at my house. Since I have gone thru the fundamentals and have them pretty well in mind, it willnot be necessary to have a large group of beginners to make it worth the time it will now take. So those who missed out on the first group - sign up now. Call me at 654-5751.   JOHN CONGER

```
   1 REM

TEACHES LETTER RECOGNITION AND
REWARDS CORRECT IDENTIFICATION

   2 PRINT AT 20,0;"THIS IS THE
FUN ENGINE THAT RUNSWHEN YOU PRE
SS THE RIGHT LETTER."
   3 PRINT AT 12,0;"                    "

   4 RAND
   5 LET L$=CHR$ (RND*25+38)
   6 FOR N=0 TO 31
   7 PRINT AT 9,N; "          "
   8 PRINT AT 10,N; "          "
   9 PRINT AT 11,N; "    000   "
  10 PRINT AT 8,N; "          "
  11 PRINT AT 11,N; "     000  "
  12 IF N=28 THEN GOSUB 23
  13 NEXT N
  14 PRINT AT 9,4; "  "
  15 PRINT AT 9,4; "  "
  16 IF INKEY$="" THEN GOTO 12
  17 IF INKEY$<>L$ THEN GOTO 20
  18 SCROLL
  19 GOTO 5
  20 PRINT AT 11,7;"  "
  21 GOSUB 23
  22 GOTO 16
  23 PRINT AT 10,8;"  "
  24 PRINT AT 11,8;L$
  25 PRINT AT 12,0;"           "

  26 PRINT AT 13,0;"                "

  27 RETURN
  28 SAVE " "RAIN
  29 CLS
  30 RUN
```

PRINTING VU-CALC ON AN 80 COLUMN PRINTER
For both the 1000 & 2068

VU-CALC is an important part of the armory of software for the Timex owner. Unfortunately, the VU-CALC owner is restricted to printing one screenful at a time.

"80 column" printers offer the potential to print far more than the Timex's 32 columns; in fact, they often offer a 132 column mode. Taking advantage of these printers requires understanding of the forms in which the spreadsheet is stored, and special programming to get the data out.

The programs below are designed to allow the user to print out any desired section of VU-CALC's spreadsheet, while retaining the coordinate references. There is NO error trapping, and it is up to the user to ensure that his desired section of spreadsheet will fit on the printer. Good luck!

The 1000 VU-CALC

The 1000 does not easily handle unassigned data. Instead, the 1000 puts the spreadsheet into a one dimensional string, B$. The essence of a spreadsheet is in its arrangement as an array in two dimensions, and B$ is chopped up in a regular way to yield those dimensions. B$ is divided into two parts: B$(1 TO 8424) holds the contents of the 936 cells with nine bytes per cell, and B$(8425 TO 9824) holds the formulas, at 35 bytes per formula.

The array data is arranged in the following manner. B$(1 TO 9) holds the contents of cell A1. The first byte holds the reference number to any associated formula. This number can be set to a specific formula number "n" (for n=0 to 40) by LET B$(1)= CHR$ n. The next eight bytes, B$(2 TO 9), hold the datum you see on the screen in cell A1. The following nine bytes hold the next cell's information--but this cell is B1, the cell below A1. The first column of cells are stored in order, then the next, and so forth, for 36 columns.

Formulas are held one after the next in the second part of B$. Each formula is allowed 32 bytes, followed by three bytes of CHR$ 255 as a divider. Absolute formulas are easy to read, but relative formulas yield only garbage on casual inspection.

To look at a particular cell, we will have to resort to some simple algebra. If we had an array of boxes, numbered like this:

```
1 4 7
2 5 8
3 6 9
```

and we wanted to reach a particular box, given its row and column number, we could use this formula:

$$cell\# = (column - 1) * 3 + row$$

In the case of VU-CALC 1000, the array is 36 wide and 26 tall, and the corresponding formula is:

$$cell\# = (column - 1) * 26 + row$$

To account for the fact that each cell occupies nine bytes, the formula becomes:

$$cell\# = (column - 1) * 26 * 9 + (row - 1) * 9$$

This program returns cell# 0 for row 1, column 1; we need to add a constant of two to move our focus to cell# 2. We might as well combine the 26 and 9, as well:

$$cell\# = (column - 1) * 234 + (row - 1) * 9 + 2$$

New program lines can be added to use the above formula and string slicing to rearrange the elements of B$ into the tabular form the reader expects.

```
9500 ~PRINT "PRINT TABLE UTILITY"
9510 PRINT "START COL ";
9520 INPUT SC
9530 PRINT SC,,"END COL   ";
9540 INPUT EC
9550 PRINT EC,,"START ROW ";
9560 INPUT S$
9570 PRINT S$,,"END ROW   ";
9580 INPUT E$
9590 PRINT E$
9600 LPRINT "PRINTER CODE HERE"
9610 REM COLUMN HDGS
9620 DIM T$(9)
9630 FOR C=SC TO EC
9640 LET T$="      "+STR$ C
9650 LPRINT T$;
9660 NEXT C
9670 LPRINT
9680 LPRINT
9690 FOR R=CODE S$-37 TO CODE E$-37
9700 LPRINT CHR$ (R+37);" ";
9710 FOR C=SC TO EC
9720 LET X=(C-1)*234+(R-1)*9+2
9730 LPRINT B$(X TO X+7)+"  ";
9740 NEXT C
9750 LPRINT
9760 NEXT R
```

And One Little Catch....

Well, two. A) There is no extra room to add programming lines to the 16K machine. B) If you have a larger memory, VU-CALC will crash if the BASIC code changes length by one byte.

Solutions:

A) Either get additional memory, or delete enough BASIC to make room for the new code. A quick way to make room is to SAVE VU-CALC, then delete the m/c lines, and type the printer driving code in.

B.1) If you delete the m/c as in A), you need not fear crashing the program, since it is crippled anyway. As you will have to type in the driver code each time you want to LPRINT an updated spreadsheet, you will probably leave out the "user friendly" lines. That would mean typing in only 9690, and 9710 through 60: and using immediate commands to set up the variables. It will still be faster than pasting all those little bits of thermal paper together.

B.2) If you have more than 16K RAM, you may either: add this code before you set up the spreadsheet; or use one of the transfer utilities (such as FASTLOAD or ZXLR-8) to move B$ to a safe cassette while you add the driver code. You can make it operate as a unified part of the program by changing the COPY in line 5030 to GOSUB 9500, and adding a RETURN line at the end. If you then use the "START VU-CALC" option, the m/c will know where the array is held, and you can reload your spreadsheet.

VU-CALC ON THE 2068

The 2068 has the ability to easily load information above RAMTOP, and VU-CALC puts both the m/c and the data there. The array is also ordered differently; in horizontal ranks, with cell# A2 following A1 in memory.

Putting the data above RAMTOP means that we can't easily use string slicing to LPRINT the results. The net result is more detail programming to get the same output. On the other hand, VU-CALC on the 2068 has better than 1500 bytes of BASIC program space available, and the 80 column routine is easily integrated into the program by changing the first statement in line 2000 from COPY to GOSUB 9600. The 80 column routine will work, too--there's plenty of room for a printer driver above the spreadsheet.

Doing the job

The spreadsheet is held as DATA at 34553, with a length of 20277 bytes. The first 20 bytes are some kind of system variables; thus the array starts at 34573. The array consists of 50 rows of 350 bytes each. The remaining 2758 bytes hold the formulas, in an unknown form (anyone want to do an article?).

To start on a given row, then, the row count is multiplied by 350, in the same way the column count was multiplied by 234 on the 1000. To start on a given column, that base value derived from the row count is added to the column count times the seven bytes per cell.

The complexities mainly came from trying to count using the alphabet as base 26. My answers to these problems, in lines 9650, 9670, and 9765 aren't elegant, but they're workable kludges. Other oddball lines include 9790, where I'm reducing the PEEKed address modulo 7 to provide spaces between the columns, and the various lines that use t$ to provide regular spacing; TAB sometimes doesn't work with 80 column printers.

```
9600 >POKE 23658,8:CLS :PRINT ''"
 80 Col. Printer Driver"
9610 INPUT "Start col: ";sc
9620 PRINT "Starting Col. = ";sc
9630 INPUT "End col: ";ec
9640 PRINT "Ending Col.   = ";ec
9650 LET s=0: INPUT "Start row:
";s$: LET s=CODE s$(LEN s$)-64+(
26*(LEN s$=2))
9660 PRINT "Starting Row = ";s$
9670 LET e=0: INPUT "End row: ";
e$: LET e=CODE e$(LEN e$)-64+(26
*(LEN e$=2))
9680 PRINT "Ending Row   = ";e$:
 POKE 23658,0
9690 REM ** Set up printer **
9700 REM Col headings
9710 LPRINT "        ": DIM t$(8):
FOR x=sc TO ec
9720 LET t$="      "+STR$ x: LPRIN
T t$;
9730 NEXT x: DIM t$(3)
9740 LPRINT
9750 LET base=34573+(s-1)*350
9760 FOR r=base TO base+(e-s)*35
0 STEP 350
9765 LET t$=s$: LPRINT t$;: LET
S$(LEN S$)=CHR$ (CODE S$(LEN S$)
+1): IF CODE S$=
91 THEN    LET S$="AA"
9770 FOR x=(sc-1)*7+r TO (ec-sc+
1)*7+r
9780 LPRINT CHR$ PEEK x;
9790 IF (x-34572)/7=INT ((x-3457
2)/7) THEN    LPRINT " ";
9800 NEXT x
9810 LPRINT
9820 NEXT r
9830 RETURN
```

(An alternate method for doing the whole job would be to SAVE off the array, and LOAD the code into a dimensioned A$(20277), using:

LOAD "" CODE (PEEK 23627+256* PEEK 23628+6)

Then use string slicing as before to print out the results.)

Using the program (1000 or 2068)

There is one line that I haven't specified. That is the line that contains the specific commands to prepare your printer to print the spreadsheet. I use compressed mode, and emphasized.

The "minimum version" (1000 only)

If you are planning to type in the minimum program when you need it, you will have to set up the parameters (sc, ec, s$, e$) in immediate commands, then use goto 9500 to start the routine. As with the "full version", calling for too many columns won't destroy anything. If you are planning to continue calculations at the same session, don't forget to remove the routine completely, or the program will crash when you attempt to "CONTINUE VU-CALC"

The "full version"

Once the patch has been added, and you are working on a spreadsheet, just use the "print" command from within the spreadsheet. When the full version is called, prompts will appear on the screen, asking for the limits of the spreadsheet that you want printed. It is up to to you to choose limits that will fit on the printer – though nothing serious will happen if you're too wide. The RETURN at the end should return you to the section of the sheet you were working on.

May your exploration of the data be fruitful!

MF

Unclassified

OCTOBER ISSUE
(HALLOWEEN)

CRYPTOGRAM:

D CDKH MASKEDXEMY OSLY YT D GRIIG

PDXXTOSSL ADNYG UNSMMSU DM D

KTIARYSN. OPSL PS YNESU YT CNSDH

UDLKS, PS MXEAASU D UEMH.

G. White
answer on p. 7

COMPUTER RECREATIONS

By A. K. Dewdney
Excerpted from: August 1985
Scientific American

The Mandelbrot set broods in silent complexity at the center of a vast two-dimensional sheet of numbers called the complex plane. When a certain operation is applied repeatedly to the numbers, the ones outside the set flee away to infinity. The numbers inside remain to drift or dance about. Close to the boundary minutely choreographed wanderings mark the onset of the instability. Here is an infinite regress of detail that astonishes us with its variety, its complexity and its strange beauty.

The set is named for Benoit B. Mandelbrot, a research fellow at the IBM Thomas J. Watson Research Center in Yorktown Heights, NY. From his work with geometric forms Mandelbrot has developed the field he calls fractal geometry, the mathematical study of forms having a fractional dimension. In particular, the boundary of the Mandelbrot set is a fractal, but it is also much more.

With the aid of a relatively simple program a computer can be converted into a kind of microscope for viewing the boundary of the Mandelbrot set. In principle one can zoom in for a closer look at any part of the set at any magnification. From a distant vantage the set resembles a squat, wart-covered figure eight lying on its side. Approaching the set one finds that each wart is a tiny figure shaped much like the parent set, however the magnified version is not quite the same set. As the zoom continues, each wart seems to reappear, but a closer look always turns up difference. Things go on this way forever, infinitely various and frighteningly lovely.

Roald Schrack has taken this idea and applied it to the 2068. His efforts follow.

THE MANDELBROT SET

The August issue of the Scientific American has on its cover a computer-generated display. I tried the scheme on my 2068. The resolution is much poorer, but the results are quite fascinating. The program shows how I set up the algorithm. Not having a color monitor, I plotted shades of gray that are obtained by the use of user-defined graphics. The subroutine starting at line 200 is run once at the beginning to set up the graphics.

The shades of gray obtained for different values are shown here. The algorithm evaluates the expres - sion "z*z+c" where z and c are complex numbers. If the "size" of z is less than 2 then the procedure is iterated. After 100 iterations z is said to converge if its size is still < 2. If z becomes > 2 at an iteration, n, which is less than 100 , then the value of n is used to choose a level of gray; the smaller the value of n, the lighter the shade of gray. Line 140 shows that white is chosen for n<20. If you have a color monitor you can eliminate the subroutine starting at line 200 and change line 142 to:

        PRINT INK a; AT x,y; "■"

The program creates a display by testing for convergence for a different value of c at each screen location. A starting value of the real and imaginary parts of c, rcz and icz is entered on lines 20 and 30. For each screen position the values of rc and ic are incremented on lines 46 and 48. The size of the increment determines the detail in the image. I have chosen to cover the range that adds .001 to the starting values in generating my image. You can try more or less. I have chosen rcz=.26 and icz=0 as my starting values. You should read the original article to get ideas for different starting values.
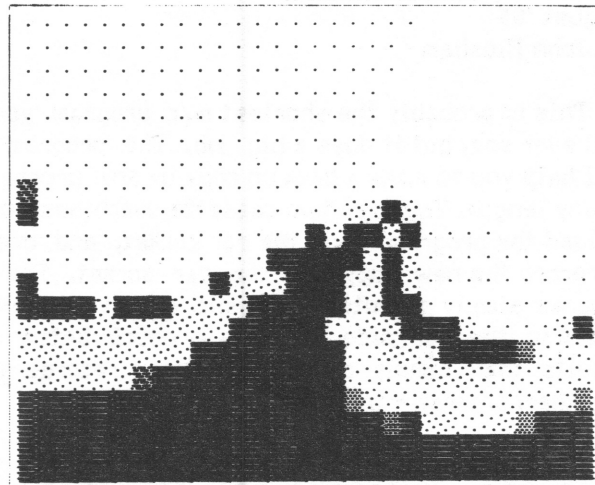
You can get a factor of 8 improvement in the resolution by using the PLOT function. This should be tried only if you have a color monitor and you have lots of time. It takes about 2 hours to generate one of the images with the present resolution of 20 x 30,so it would take about 5 days to do an image 160 x 240.

                                R. A. Schrack


```
 10 PRINT "give real and imagin
ary parts of c"
 15 GO SUB 200
 20 INPUT rcz
 30 INPUT icz
 32 CLS
 40 FOR x=1 TO 20
 42 FOR y=1 TO 30
 44 LET n=1
 46 LET rc=rcz+.000033*y
 48 LET ic=icz+.00005*x
 50 LET iz=0
 60 LET rz=0
 70 LET rz=rz*rz-iz*iz+rc
 80 LET iz=2*rz*iz+ic
 86 LET n=n+1
 90 LET size=SQR (rz*rz+iz*iz)
100 IF (size)=2.) THEN GO TO 14
0
110 IF (n<=99) THEN GO TO 70
120 PRINT AT x,y;"■"
130 GO TO 150
140 LET a=INT ((n-20)/10)
142 PRINT AT x,y;CHR$ (145+a)
152 NEXT y
170 NEXT x
200 FOR m=0 TO 8
205 LET w=145+m
210 FOR p=0 TO 7
220 READ byte
230 POKE USR CHR$ w+p,byte
240 NEXT p
260 NEXT m
270 DATA 0,0,0,0,0,0,0,0
280 DATA 0,0,0,8,0,0,0,0
290 DATA 0,0,32,0,0,0,2,0
300 DATA 0,64,4,0,0,32,2,0
310 DATA 8,64,2,16,128,4,32,1
320 DATA 0,85,0,85,0,85,0,85
330 DATA 170,85,170,85,170,85,1
70,85
340 DATA 187,221,238,119,187,22
1,238,119
350 DATA 255,255,255,255,255,25
5,255,255
360 RETURN
```

COMPLEX NUMBERS are an area of mathematics that has wide application in physics and in electrical engineering. The complex number **Z** has two components called the real and imaginary parts. $Z = rz + i * iz$ where $i = \sqrt{-1}$. The rule for addi- tion $C = A + B$ is $rc=ra+rb$ and $ic=ia+ib$. The rule for multipli- cation $C = A * B$ is: $rc=ra*rb-ia*ib$ & $ic=ra*ib+rb*ia$. Thus lines 70 and 80 above cal- culate the real and imaginary parts of $Z = Z * Z + C$.

Spectrum machine code
Lifted from <u>The Sinc Times</u>,
August '85
By John Bloxham

This is probably the shortest m/c program you will ever see, but it does a big job. The program will help you to make a back up copy of any program of any length. You need two cassette machines, one to load the program in via the ear socket, and one to record the new copy via the ear socket. The program simply outputs to the mic socket whatever comes in the ear side. It does produce better results than simply connecting two recorders together, anyway – try it and see.

```
  1 REM Tape to tape copier
 10 FOR n=USR "a" TO USR "a"+8
 20 READ c: POKE n,c: NEXT n
 30 DATA 243, 14, 254, 237,
120, 237, 121, 24, 250
 40 RANDOMIZE USR USR "a"
```

The program is relocatable but for convenienceitis loaded into the UDG area. Note that the color of the border will not change, and you will have to pull the plug to get out of the program when you are through recording.

EDITOR'S NOTE!
I've tried this machine on two different Spectrum emulators, and haven't been able to get it to work. I'm printing it to solicit some member's development, as it would be a <u>very</u> useful program if it could be debugged. MF

MACHINE CODE BITS

Brian Little has written the following machine code bits for the T/S 1000. As you write your programs, these bits can help you get results from the 1000.

There will be more next month.

INKEY$ (22 bytes)
```
CD BB 02      CALL 02BB
7C            LD A,H
C6 02         ADD A,2
38 09         JR C 09
44            LD B,H
4D            LD C,L
CD BD 07      CALL 07BD
06 00         LD B,0
4E            LD C,(HL)
D8            RET C
01 00 00      LD BC,0000
C9            RET
```

SET CURSOR (7 bytes)
```
01 cl rw      LD BC, rw cl
CD F5 0B      CALL 0BF5
C9            RET
```

REAL APPLICATIONS

The Problem:

Starkville, MS
February 5, 1985

Dear Sir:

I am currently working on a data aquisition system for my senior design project using the T/S 1500. Adequate information on this computer has been difficult to obtain or understand, since I have only recently begun to use the T/S for purposes other than simple BASIC programming. The following are areas in which any assistance you would offer would be appreciated.

It would be very convenient if the data collected could be (1) transferred to cassette tape in the field, brought in to be transferred to an IBM PC, and then to the mainframe; or, (2) bring in the T/S every month or so, load the tapes with data into the T/S memory, then into the IBM. I am thinking of using the AERCO RS232 I/F to go with option (2).

Other problems I have encountered are lack of cassette control by the program, lack of an internal clock, lack of a printer, and a need for documentation on the manipulation of locations that can be POKEd. However, low cost, size, programming features, and low power consuption of the computer favor its use in some field applications.

In this project, it was intended to be used to collect information about water flow levels using a rechargable battery for power.
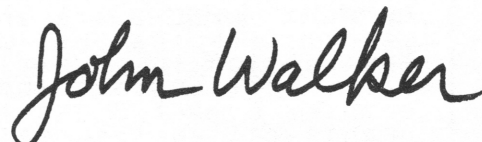
A potentiometer will begeared into a float that measures water level through a flume. The pot reading is converted into a digital signal by an (8+8)*8 analog interface. The digital reading ranges from 0 to 255.

The program reads the measurement at regular intervals. Since it is best tokeep the field equipment to a minimum due to power requirements, a monitor and printer will not be used in the field. INKEY$ will be used to control the operation of the program; stop the run, save the data to tape, and resume operation of the program.

Since we have only one T/S available, it would be convenient to store the data on tape to be read into the IBM directly, through its cassette port. If necessary, the data may be uploaded by the T/S and its RS232 by bringing in the computer on off days.

Any suggestions would be useful. Thank you for you time!

Sincerely,

John Walker

And The Solution:

August 21,1985

Dear Sir:

  Enclosed is a report of my project with the 1500 that I contacted you about earlier. We have just field tested it last week due to several delays. It appears to be working well.
  Thank you for your correspondence.

The purpose of the data aquisition system is to take in analog data from instrumentation, convert the data to a digitized form, store the data, and transfer the data to other computers for analysis. Benefits of the system include the saving of time and money, as compared to previous means of data aquisition and handling, as well as diversity in application. To achieve these goals, a system was developed that was built around a Timex-Sinclair 1500 computer.

First, an analog to digital converter board was used to convert the analog electrical stimulus to a digital form that could be interpreted by the computer. Inputs to the board are received in the form of voltages from 0 to 2.55 volts through an eight channel input bus. The eight channels allow data to be collected almost simultaneously from several inputs so that one input might be better correlated to the others. Outputs are received by the computer in the form of a number between 0 and 255.

The computer then may either record the input number as is or convert the number to the corresponding physical measurement before recording it in memory. The computer serves as a means of data reception and manipulation, data storage, and overall system control. Since it is programmable in BASIC, it is easier for personnel to operate the system versus programming an alternative control unit such as a microprocessor. Being programmable, it is

more diversified in function than some systems that are specific to their task. The power outlet, recorder, and printer are all directed by the computer.

The power outlet is a controlled power source by which the recorder and printer are controlled. Since the computer was not equipped with a function to shut the recorder and printer off and on, the controlled outlets were necessary. By this means the recorder and printer may be turned on or off as needed. Thus, the outlet serves as a control unit and as a means of conserving power when the system is in the field being powered by a DC power source.

The DC power source is regulated to provide power to the computer, recorder and controlled outlet in the form of a DC supply. However, the printer requires an AC supply. Therefore, the 12V DC is converted to 117V AC by a power inverter. The power inverter supplies the controlled outlet for the printer. When using a DC source, only the printer is supplied with AC power, the recorder and computer being directly powered by the DC source.

The printer serves as a monitor of the internal actions of the system, as needed, and as a means of recording data in addition to the recorder. This means of monitoring provides a hard copy of information and has less space and weight requirements than a television. The recorder provides the primary means of data storage and serves as a backup copy to data transferred to other computers.

The data transfer is accomplished by means of a telephone modem. The modem allow data and programs to be transferred from the computer to almost any other computer system. Therefore, the computer has at its disposal any computer facilities available to the systems with which it is able to communicate. It also

continued from 13

features a RS232C communication device that can be used with some modification of the modem hardware. Further, the modem provides additional possibilities for using the system in remote locations with less hardware. By telephone communication, data could be instantly transferred and monitored by other computer facilities eliminating the need for an in field AC power inverter, cassette recorder, printer, controlled outlet, and a large computer memory.

Operation of the system consists of first connecting the power supply. For a 12V DC supply, connect the source to the power inverter. Then, the controlled outlet is connected to the power inverter. Switch the power switch of the power inverter on. The power switch of the controlled outlet is then switched to the DC option. Cables from the recorder and computer DC power outlets are then connected to the controlled outlet box as labeled. The printer transformer is plugged into the labeled 117V outlet and connected to the printer power outlet.

In the case of a 115V power supply, these procedures are followed. The controlled outlet is connected to the 115V source. The power switch is flipped to the AC option. The recorder, computer, and printer are connected to the controlled outlet as labeled. The computer is not turned on or off by a switch, but is powered as soon as the plug from the power source is inserted in the power jack.

Next, it is necessary to load the program from cassette to computer. First type POKE 36867,255. This statement turns all the outlets on. Then press play on the recorder and type LOAD " program name ". Then press ENTER. Allow sufficient time for the program to load as predetermined in lab. Then press RUN. Program begins to execute and may ask for inputs as indicated by the printer. The program should contain statements to automatically save the programs and data.

After the run, reverse the operating procedures concerning power supply and disconnect analog input lines. The system may then be taken to the lab for data transfer to other computers by

modem. The information is transferred as outlined by the user manual for the modem.

Overall, the system offers several advantages to previous means of data collection. First, it provides accurate digitization of analog inputs versus prior time consuming methods of manual digitization. The data can be viewed and manipulated at once or more quickly analyzed than previously available. Also, the system is versatile in function. The system can be used in the field or in the lab due to its power inverter. The power inverter may also be used without the other system components. In addition, the controlled outlet can be used to control other devices as well. This system should be well suited for a variety of applications.

ROUNDUP...SOUTH MARENGO AVENUE...FROM TERRY
1480 SOUTH MARENGO AVENUE
PASADENA, CA. 91106
818-799-2933

```
1 PRINT "    ENTER YOUR DECIMA
L NUMBER"
2 LET D=100
3 INPUT N$
4 LET M$=STR$ (INT (VAL N$*D+
.5)/D)
5 PRINT N$,M$
6 GOTO 3
7 REM
```

TO CHANGE NUMBER OF DECIMAL
PLACES ADJUST VALUE VARIABLE D

The KEY LINE is line 4 .... for most internal program use it should be written.

LET N$=STR$(INT(VAL N$*100+.5)/100)

This provides two decimal places as in dollars and cents, rounds the last penny up corectly and only uses up one program line. It should ALWAYS be used when any monetary figures are DEVIDED within your program as this is the place you will get an endless decimal answer that messes up your nice printout format!

Terry Hardenbergh

Capitol Area Timex/Sinclair Users' Group
P.O.Box 725
Bladensburg, MD 20710

Name _____

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_____ ZIP _____

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Memberships - $15.00 (family/individual);make checks payable to C.A.T.S.

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_____

Occupation _____

Ham Radio call sign _____

Equipment

ZX 80 _____   RAM size _____

ZX 80 _____   full keyboard _____

ZX 81 _____   Printer _____

TS 1000 _____   type _____

TS 2000 _____   other interface _____

Special interest use for computer: ie, games, ham radio interface,

business, other, etc. _____

Languages: Basic _____   Other _____

            Machine _____

No. of years computer experience _____

What committees would you like to serve on? _____

Comments: _Where did you hear of C.A.T.S.?_ _____

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The mailing address of the Capitol Area Timex/Sinclair User's group is:

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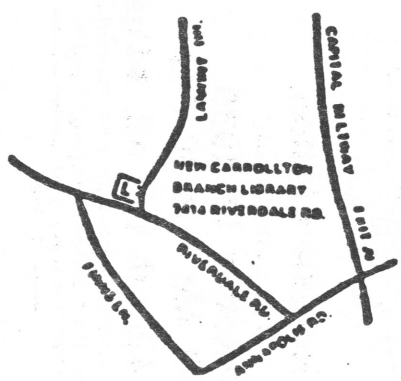P.O. Box 725
Bladensburg, MD 20710

CATS is a non-profit special interest organization dedicated to serving the interests of those who own, use, or are interested in learning more about the Timex/Sinclair family of personal computers.

The official contact person for CATS is JULES GESANG:
301*922-0767

Meetings are held on the second Saturday of each month at 2 P.M. in the large meeting room of the New Carrollton Branch Public Library.

Ham Radio Network Information
QZX Net...Wednesdays, 9p.m. local time: 14.345 MHz NV4F NCS
Eastern Regional Sinclair Net...Sundays, 1600 Z: 7.243 MHz
                                                          KQ2F NCS

- -

CATS Newsletter
P.O. Box 725
Bladensburg MD   20710

The next meeting of C.A.T.S. will be on:
Saturday, October 12.
11:00 AM Hardware workshop,
2:00 PM General meeting.

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